

ABSTRACT OF THE DISCLOSURE

A semiconductor substrate, on which a silicon dioxide film with a resist film defined thereon has been formed, is placed inside a reaction chamber of a plasma processing system. Then, a fluorocarbon gas with a C/F ratio of 0.5 or more is introduced into the reaction chamber. In this process step, the flow rate of the gas is controlled such that the residence time τ of the gas in the reaction chamber becomes greater than 0.1 sec and equal to or less than 1 sec in accordance with an equation $\tau = P \times V / Q$, where τ is the residence time (unit: sec), P is a pressure (unit: Pa) of the gas, V is a volume (unit: L) of the reaction chamber and Q is the flow rate (unit: Pa · L/sec) of the gas. Thereafter, plasma is created from the fluorocarbon gas and the silicon dioxide film is plasma-etched using the resist film as a mask.